Abstract

A challenging problem of computer vision is scene classification. An efficient method for classifying natural scenes from the Oliva – Torralba dataset is proposed. The method is based on K-Means clustering algorithm followed by a novel two phase voting method for classification which is the main contribution of this paper. Two distinct feature sets have been used. The first feature set is used for grouping perceptually similar images into two clusters based on K-Means algorithm. The second feature set is selected based on observed visual attributes of images in these two clusters. Classification is achieved by a novel voting method which firstly assigns test image to the most similar cluster. Each cluster contains images from four categories. Therefore to assign test image to correct category within an assigned cluster, candidate voters from the assigned cluster are selected. The category of majority candidate voters decides the class of test image. The efficiency of the proposed voting scheme is that 83.4% test images are correctly classified. Silhouette index, purity, variance, F-measure and Rand’s metric are used for cluster validation.
A Novel Approach to Scene Classification using K-Means Clustering

References


Index Terms

Computer Science
Software Engineering
Keywords

Scene classification, K-means clustering, holistic features, image mining, cluster mapping, semantic labelling, purity, silhouette index, F-measure